Journal of Bodywork & Movement Therapies (2016) 20, 588—594

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/jbmt

Treatment of hip microinstability and gluteal tendinopathies involves movement control and exercise

A collection of hip problems

A musculoskeletal therapist or exercise professional will often see patients or clients of different ages, sexes and fitness levels who present with issues that can be related to imbalances in muscles that control movement at and across the hip. These issues involve complex patterns of cause and effect and can be observed whether an individual is inactive or participates in high level sports or performance disciplines.

Habitual postural sway in which the trunk moves back relative to the pelvis disadvantages the gluteal muscles and biases active postural control to the 2-joint hamstrings, making them inextensible and short (Sahrmann, 2002). Undergraduate ballet dancers can cheat their turn out at the knee rather than create the required external rotation at the hip. They may also anteriorly tilt their pelvis so that the tensor fascia lata (TFL) musculature restricts the hips ability to turn out, and at the other end of the ilio-tibial band (ITB) can increase external rotation of the tibia due to the shortened TFL/ITB. A mature woman can report lateral hip pain at night in bed when they sleep on their side with the pain coming from either hip, caused by compressive forces. The lower most hip's gluteal tendons, bursae and fascia are directly compressed and the adducted position of the upper-most leg places a longitudinal tensile force on its ipsilateral structures. A football player diagnosed with a cam type femoral acetabular impingement (FAI), a morphological change at the head and neck of the femur consisting of an overgrowth or exotosis of bone that impinges the femur on the labrum and acetabular rim (Kuhlman and Domb, 2009) during vigorous hip movement (Sankar et al., 2013), may find their post surgical muscular balance is subtly affected, and a reported lack of return to normal gait patterns may contribute in the long term to degenerative changes the surgery was intended to prevent (Brisson et al., 2013).

In recent years the understanding of the hip has broadened from looking at the often surgical treatment of the osteoarthritic (OA), degenerative hip in the older population to conditions often affecting the younger, and sometimes more active, individual; Labral tears and FAI — conditions that can be inter-related and are implicated in later degeneration of the hip (Bedi et al., 2011). Gluteal tendinopathies are also becoming better understood and are identified as a primary local source of lateral hip pain, though high quality research on both diagnostic tests and management are still lacking (Grimaldi and Fearon, 2015). A recent review paper by Kalisvart and Safran (2015) differentiates between the well understood traumatic dislocation and subluxation of the hip and symptomatic hip 'microinstability' commenting that 'it is more poorly defined, has a less dramatic clinical presentation, lacks consistent objective evaluative criteria, and has only recently emerged as a significant cause of pain and disability in younger patients and athletes'. They report findings that suggest ligamentous laxity and peri-articular muscular weakness are potential causes, as well as subtle anatomic abnormalities associated with activities such as golf, figure skating, gymnastics, ballet, martial arts, baseball, tennis and football, which involve repetitive rotational hip movements, or axial loading of the hip, which can increase the translatory movement (2—5 mm) of the femoral head relative to the acetabulum. It is this undesirable joint play that may contribute to damage of the labrum, joint cartilage and capsular structures.

Hip stability

Anatomically the hip is considered to be stable as it has passive, active and neural factors that act synergistically to create stability (Retchford et al., 2013).

The passive elements involve the skeletal architecture of the acetabular socket, the relatively small femoral head

http://dx.doi.org/10.1016/j.jbmt.2016.06.012

(when compared to the gleno-humeral joint), the capsuloligamentous structures and the labrum. The 3–8 mm width of the labrum increases the acetabular volume by about 20% (Tan et al., 2001), not only increasing coverage of the femoral head by the combined soft tissue and bony acetabular structure but also creating a seal that uses suction to help provide further stability. A labral tear reduces the force required to distract the hip joint by 60% (Crawford et al., 2007) highlighting the labrum's importance in hip joint stability. The capsuloligamentous structure of the hip consists of 3 ligaments – the iliofemoral ligament (ILFL), pubofemoral ligament (PFL) and ischiofemoral ligament (ISFL) – that spiral around the femoral head and combine with the circular zona orbiculares so that in extension abduction and internal rotation of the hip joint the tightening ligaments provide compression of the femoral head into the acetabulum. This is called the closed pack position. Hip flexion, combined with adduction and external rotation (the open pack position), is the position that the capsuloligamentous structure is at its most unconstrained as the bony stability provided by the set of the position of the acetabulum is at its greatest. Retchford et al. (2013) highlights that only the periphery of the acetabulum articulates with femoral head and in stance the anterior and superior part of the femoral head is exposed allowing greater flexion but increasing reliance on the anterior soft tissues and connective tissue structures for stability during hip extension.

The acetabulum is anteverted (inclined forward), anteriorly tilted (gently facing inferiorly) by 10–15° and laterally tilted by 45° in the pelvis. The neck of the femur has 130 degrees of superior inclination from the shaft (neck-shaft angle) and is in 10 degrees of anteversion (Kalisvart and Safran, 2015) but bony variance occurs. In conditions such as dysplasia in which the acetabulum is shallow, and its opposite variation, where the acetabulum appears 'too deep', gives rise to pincer type FAI. 'Under coverage' of the femoral head occurs in dysplasia, placing more stress on the labrum, and 'over coverage' occurs in pincer type FAI, allowing abutment of the femur on to the acetabular rim and labrum, leading to damage at the impact points and an increase in shear forces with potentially negative consequences at tissue interfaces. It is not a surprise then that dysplasia and FAI are considered the two most common causes of OA (Bedi et al., 2011), although longitudinal research indicates a predisposition to OA in certain patients with FAI, it is not clear yet what type and severity of intra-articular damage is required before there is a longer term risk of developing *clinically significant* hip OA (Sankar et al., 2013).

The active systems that create hip stability consist of the muscles around the hip. Retchford et al. (2013) (see Table 1) summarises succinctly the current theorised interaction between local muscles' capacity to provide joint stabilisation and global muscle activity about the hip by referring to lumbar, cervical, and shoulder research. 'Muscles that can generate large forces over small changes in muscle length and muscles that have lines of forces predominately creating joint compression could be considered to be primary active stabilisers'. Local muscles being physically deep and fatigue resistant are suited to postural control when acting synergistically. They use feed forward systems to improve postural control, whereas global muscles with their larger cross sectional area (CSA), and greater moment arms are more effective in generating force and accelerating joint motion. In pathological situations the local muscles may become inhibited and the global muscles may become over-active. Recruitment pattern changes in muscles around the Sacro-iliac joint (SIJ) have been shown that supports this argument (Hungerford et al., 2003). Retchford et al. propose that specificity of exercise improves inhibited local muscle activation, and warn that prescribing non-specific training, in which both local and global muscles contract, before local muscle function returns, may delay recovery (2013). Many therapists, influenced by Janda's approach, may treat the hypertonicity first before attending to the under-recruited muscles (Janda, 1983) (Table 1).

Difficulty in diagnosis of hip conditions

Perhaps a reason that recognition of FAI, labral tears and other non arthritic groin related pain, is a relatively recent area of research into hip pathologies is the difficulty in differentially diagnosing hip and groin related symptoms. For example a Sports hernia or 'athletic pubalgia' is painful and often ascribed to overuse. It can present with weakness or a tear of the posterior inguinal wall but without a clinically recognisable hernia. It can also present with insertional injury of the rectus abdominis (Kahn et al., 2013), oblique muscle avulsion at the pubic tubercle, or injury within the internal oblique or the external oblique aponeurosis (Gilmores's groin). Bedi et al. (2011) report that this often is present in athletes with FAI, limiting hip flexion and internal rotation thereby creating abnormal movement of the hemi-pelvis. 'When the functional range of motion (ROM) required to compete in sports is greater than the physiologic motion allowed by the hip, compensation may occur in the lumbar spine, sacroiliac joint, pubic symphysis and posterior hip subluxation'. This in turn can affect the muscles across the pelvis and create issues in adductor longus, the proximal hamstrings, the abductors, iliopsoas and the hip flexors. High energy twisting in sports, trunk hyperextension and hyper-abduction are actions implicated in athletes with stronger adductors and relatively weaker lower abdominals. The pain is in the anteriomedial hip but can refer to the adductors, perineum, testicle or rectus abdominis, it increases on activity and reduces with rest. Surgical repair with or without mesh can be offered if conservative approaches are not successful. A case study, presented in this Prevention and Rehabilitation section, by Navot and Kalichman (2016), shows also that the pelvic floor musculature can be a source of hip and groin pain.

As 90% of all patients with labral pathology have associated bony deformities (Bedi et al., 2011) labral tears and FAI's have similar presentations, it is not until imaging is undertaken that altered bony morphology can be visualised. Labral tears present with anterior hip or groin pain and sometimes buttock pain. Patients often indicate the site of the pain with the 'C'-sign - making a C with the thumb and index finger and cupping the anterior hip region with the fingers at the fold of the hip. Frequently there are